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Fig.1

Codeword Label	Input data octet	-ve alphabet codeword	+ve alphabet codeword
D0.0	000 00000	100111 0100	011000 1011
D1.0	000 00001	011101 0100	100010 1011
D2.0	000 00010	101101 0100	010010 1011
D3.0	000 00011	110001 1011	110001 0100
D4.0	000 00100	110101 0100	001010 1011
D5.0	000 00101	101001 1011	101001 0100
D6.0	000 00110	011001 1011	011001 0100
D7.0	000 00111	111000 1011	000111 0100
D8.0	000 01000	111001 0100	000110 1011
D9.0	000 01001	100101 1011	100101 0100
D10.0	000 01010	010101 1011	010101 0100
D11.0	000 01011	110100 1011	110100 0100
D12.0	000 01100	001101 1011	001101 0100
D13.0	000 01101	101100 1011	101100 0100
D14.0	000 01110	011100 1011	011100 0100
D15.0	000 01111	010111 0100	101000 1011
D16.0	000 10000	011011 0100	100100 1011
D17.0	000 10001	100011 1011	100011 0100
D18.0	000 10010	010011 1011	010011 0100
D19.0	000 10011	110010 1011	110010 0100
D20.0	000 10100	001011 1011	001011 0100
D21.0	000 10101	101010 1011	101010 0100
D22.0	000 10110	011010 1011	011010 0100
D23.0	000 10111	111010 0100	000101 1011
D24.0	000 11000	110011 0100	001100 1011
D25.0	000 11001	100110 1011	100110 0100
D26.0	000 11010	010110 1011	010110 0100
D27.0	000 11011	110110 0100	001001 1011
D28.0	000 11100	001110 1011	001110 0100
D29.0	000 11101	101110 0100	010001 1011
D30.0	000 11110	011110 0100	100001 1011
D31.0	000 11111	101011 0100	010100 1011

Fig.2

Codeword Label	Input data octet	-ve alphabet codeword	+ve alphabet codeword
D0.4	100 00000	100111 0010	011000 1101
D1.4	100 00001	011101 0010	100010 1101
D2.4	100 00010	101101 0010	010010 1101
D3.4	100 00011	110001 1101	110001 0010
D4.4	100 00100	110101 0010	001010 1101
D5.4	100 00101	101001 1101	101001 0010
D6.4	100 00110	011001 1101	011001 0010
D7.4	100 00111	111000 1101	000111 0010
D8.4	100 01000	111001 0010	000110 1101
D9.4	100 01001	100101 1101	100101 0010
D10.4	100 01010	010101 1101	010101 0010
D11.4	100 01011	110100 1101	110100 0010
D12.4	100 01100	001101 1101	001101 0010
D13.4	100 01101	101100 1101	101100 0010
D14.4	100 01110	011100 1101	011100 0010
D15.4	100 01111	010111 0010	101000 1101
D16.4	100 10000	011011 0010	100100 1101
D17.4	100 10001	100011 1101	100011 0010
D18.4	100 10010	010011 1101	010011 0010
D19.4	100 10011	110010 1101	110010 0010
D20.4	100 10100	001011 1101	001011 0010
D21.4	100 10101	101010 1101	101010 0010
D22.4	100 10110	011010 1101	011010 0010
D23.4	100 10111	111010 0010	000101 1101
D24.4	100 11000	110011 0010	001100 1101
D25.4	100 11001	100110 1101	100110 0010
D26.4	100 11010	010110 1101	010110 0010
D27.4	100 11011	110110 0010	001001 1101
D28.4	100 11100	001110 1101	001110 0010
D29.4	100 11101	101110 0010	010001 1101
D30.4	100 11110	011110 0010	100001 1101
D31.4	100 11111	101011 0010	010100 1101

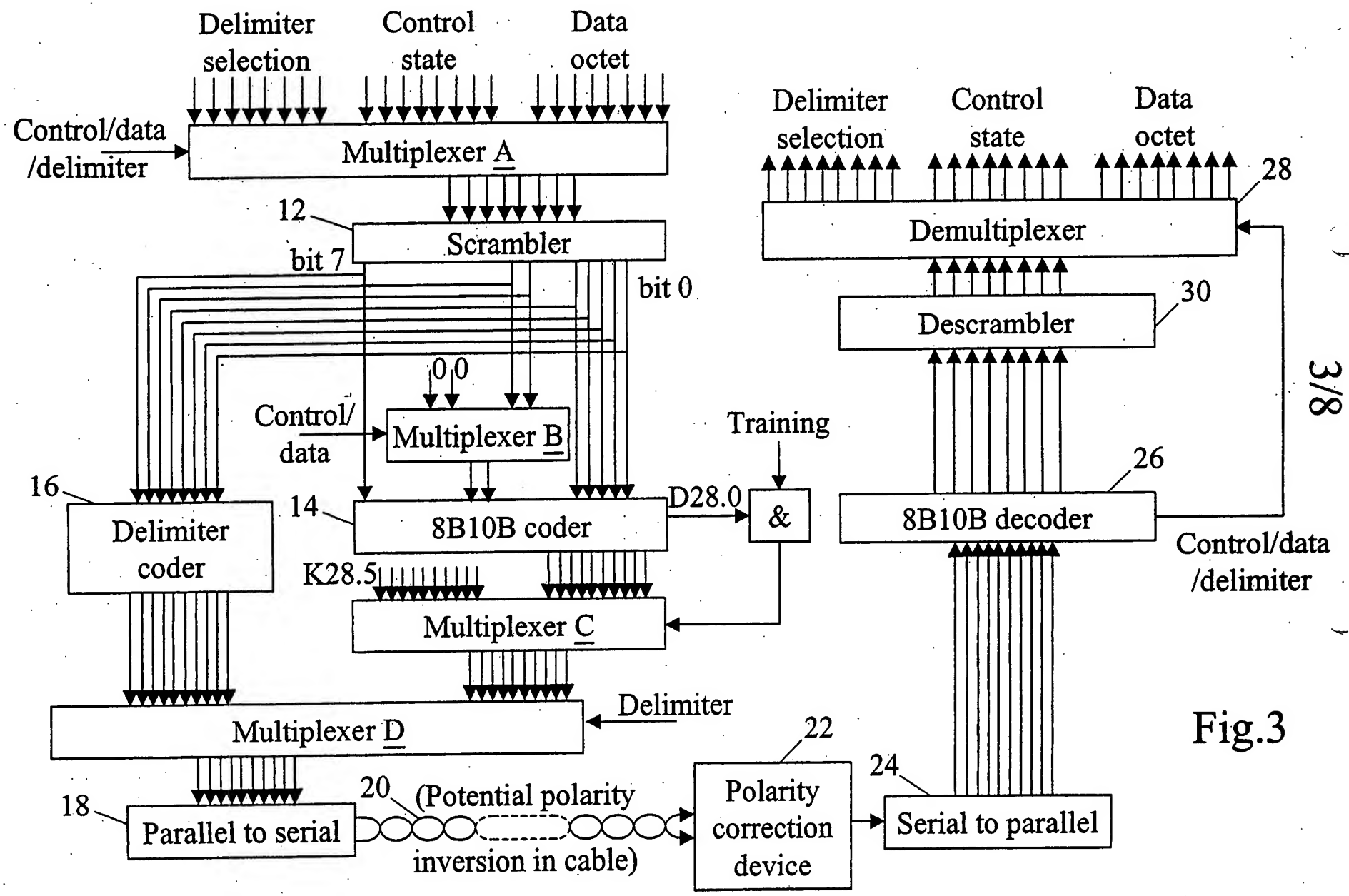
Delimiter selection
Control state
Data octet
Control/data /delimiter
Multiplexer A
12
Scrambler
bit 7
bit 0
0 0
Control/ data
Multiplexer B
Training
16
Delimiter coder
14
8B10B coder
D28.0
&
K28.5
Multiplexer C
Delimiter
Multiplexer D
18
Parallel to serial
20
(Potential polarity inversion in cable)
22
Polarity correction device
24
Serial to parallel
Delimiter selection
Control state
Data octet
28
Demultiplexer
30
Descrambler
26
8B10B decoder
Control/data /delimiter

Fig.3

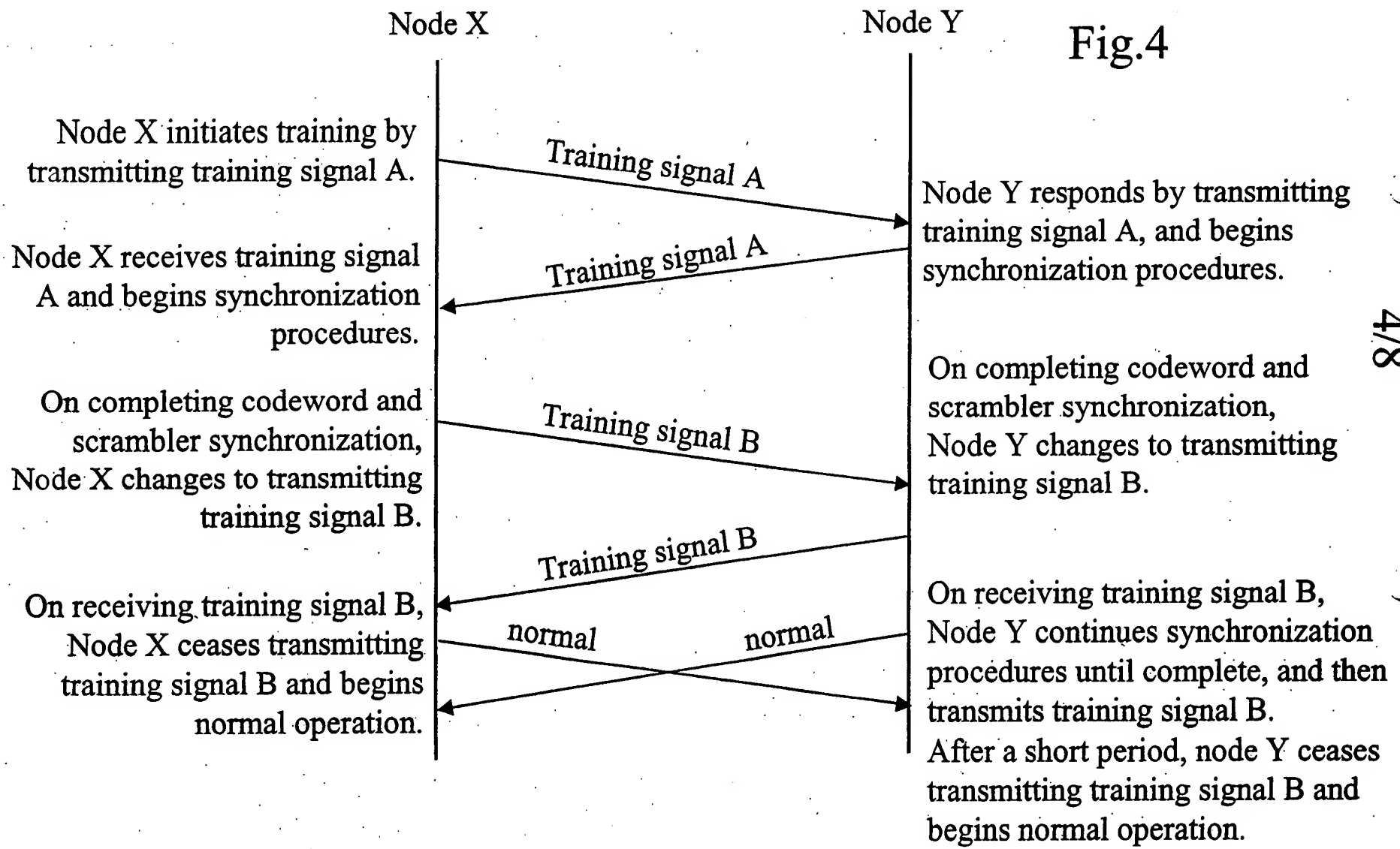
Node X
Node Y
Node X initiates training by transmitting training signal A.
Training signal A
Node Y responds by transmitting training signal A, and begins synchronization procedures.
Node X receives training signal A and begins synchronization procedures.
Training signal A
On completing codeword and scrambler synchronization, Node X changes to transmitting training signal B.
Training signal B
On completing codeword and scrambler synchronization, Node Y changes to transmitting training signal B.
Training signal B
On receiving training signal B, Node X ceases transmitting training signal B and begins normal operation.
normal
normal
On receiving training signal B, Node Y continues synchronization procedures until complete, and then transmits training signal B.
After a short period, node Y ceases transmitting training signal B and begins normal operation.

Fig.4

Time period	T1	T2	T3	T4	T5	T6
Control state	000 00000	000 00000	000 00000	000 00000	000 00000	000 00000
Multiplexer B O/P	000 11011	100 00011	000 11100	000 00000	000 00101	100 01111
Codeword label	D27.0	D3.4	D28.0	D0.0	D5.0	D15.4
Multiplexer C O/P: codeword label	D27.0	D3.4	K28.5	D0.0	D5.0	D15.4
Multiplexer C O/P	1101100100	1100011101	1100000101	1001110100	1010011011	1010001101
RDS of transmitted signal	-	-	+	-	-	+
Polarity correction	Off ---------->					
Received codeword	0010011011	0011100010	0011111010	0110001011	0101100100	0101110010
Rec'd codeword label	D27.0	D28.4	K28.5	D0.0	D26.0	D15.4
Decoder output	Codeword synchronisation --------->			000 00000	000 11010	100 01111
Descrambler output				Descrambler synchronisation --------->		

Fig.5

Time period	T7	T8	T9	T10	T11	T12
Control state	000 00000	000 00000	000 00000	000 00000	000 00000	000 00000
Multiplexer B O/P	100 01111	100 10011	100 00010	000 11100	100 00000	000 00001
Codeword label	D15.4	D19.4	D2.4	D28.0	D0.4	D1.0
Multiplexer C O/P: codeword label	D15.4	D19.4	D2.4	K28.5	D0.4	D1.0
Multiplexer C O/P	1010001101	1100100010	1011010010	0011111010	0110001101	1000101011
RDS of transmitted signal	+	+	-	-	+	+
Polarity correction	Off ---------->					
Received codeword	0101110010	0011011101	0100101101	1100000101	1001110010	0111010100
Rec'd codeword label	D15.4	D12.4	D2.4	K28.5	D0.4	D1.0
Decoder output	100 01111	100 01100	100 00010	000 11100	100 00000	000 00001
Descrambler output	Descrambler synchronisation ---------->					

Fig.6

Time period	T13	T14	T15	T16	T17	T18
Control state	000 00000	000 00000	000 00000	000 00000	000 00000	000 00000
Multiplexer B O/P	100 00101	000 11111	100 01001	100 01100	000 11010	000 01011
Codeword label	D5.4	D31.0	D9.4	D12.4	D26.0	D11.0
Multiplexer C O/P: codeword label	D5.4	D31.0	D9.4	D12.4	D26.0	D11.0
Multiplexer C O/P	1010010010	1010110100	1001011101	0011010010	0101101011	1101000100
RDS of transmitted signal	+	-	-	+	-	+
Polarity correction	Off ---------->			On ---------->		
Received codeword	0101101101	0101001011	0110100010	0011010010	0101101011	1101000100
Rec'd codeword label	D26.4	D31.0	D22.4	D12.4	D26.0	D11.0
Decoder output	100 11010	000 11111	100 10110	100 10011	000 00101	000 10100
Descrambler output	Descrambler synch'n --->		000 11111	000 00000	000 00000	000 00000
			<--Rx control signal <> 000 00000: Polarity inversion!			

Fig.7

Time period	T19	T20	T21	T22
Control state	000 00000	000 00000	000 00000	000 00000
Multiplexer B O/P	100 01001	000 00100	000 11011	000 00011
Codeword label	D9.4	D4.0	D27.0	D3.0
Multiplexer C O/P: codeword label	D9.4	D4.0	D27.0	D3.0
Multiplexer C O/P	1001011101	0010101011	0010011011	1100010100
RDS of transmitted signal	-	+	+	+
Polarity correction	On ---------->			
Received codeword	1001011101	0010101011	0010011011	1100010100
Rec'd codeword label	D9.4	D4.0	D27.0	D3.0
Decoder output	100 10110	000 00100	000 11011	000 11100
Descrambler output	000 00000	000 00000	000 00000	000 00000

Fig.8